AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1. (Withdrawn) A fuel cell system, comprising:

a fuel cell catalytically reacting to a feed stream;

a compressor in fluid communication with said fuel cell to provide a fluid flow of said feed stream to said fuel cell.

a mass flow sensor that generates a mass flow signal based on said fluid flow from said compressor; and

a controller that generates a compressor command signal and that processes said mass flow signal and a mass flow sensor model through a Kalman Filter (KF) – based signal processing algorithm to provide a future signal estimate.

2. (Withdrawn) The fuel cell system of claim 1 wherein said controller controls said fuel cell system based on said future signal estimate.

3. (Withdrawn) The fuel cell system of claim 1 wherein said mass flow sensor model is a 3rd order model.

4. (Withdrawn) The fuel cell system of claim 1 wherein said controller predicts a current signal estimate based on a previously smoothed signal estimate.

5. (Withdrawn) The fuel cell system of claim 4 wherein said controller determines said previously smoothed signal estimate based on a previously predicted estimate, a previous signal measurement and a previous gain.

6. (Withdrawn) The fuel cell system of claim 4 wherein said controller calculates a smoothed current signal estimate based on a predicted current estimate, a current measurement and a gain.

7. (Withdrawn) The fuel cell system of claim 6 wherein said future signal estimate is based on said smoothed current signal estimate.

8. (Withdrawn) The fuel cell system of claim 7 wherein said future signal estimate is further based on a current command signal.

9. (Withdrawn) The fuel cell system of claim 8 wherein said controller calculates said current command signal based on a compressor control signal model.

10. (Currently Amended) A method of operating a fuel cell system comprising:

monitoring ~~a~~ an air mass flow rate from a compressor to a fuel cell stack with a flow meter[:];

modeling said flow meter with a first mathematical formula;

generating a measured signal from said flow meter;

processing said first mathematical formula and said measured signal through a KF-based signal processing algorithm to provide a future signal estimate; and

operating said compressor based on said future signal estimate.

11. (Original) The method of claim 10 wherein said first mathematical formula consists of a 3rd order model of said flow meter.

12. (Original) The method of claim 10 further comprising predicting a current signal estimate based on a previously smoothed signal estimate.

13. (Original) The method of claim 12 wherein said previously smoothed signal estimate is determined based on a previously predicted estimate, a previous signal measurement and a previous gain.

14. (Original) The method of claim 12 further comprising calculating a smoothed current signal estimate based on a predicted current estimate, a current measurement and a gain.

15. (Original) The method of claim 14 wherein said future signal estimate is based on said smoothed current signal estimate.

16. (Original) The method of claim 15 wherein said future signal estimate is further based on a current command signal.

17. (Original) The method of claim 16 further comprising:

modeling a compressor command signal with a second mathematical formula; and

calculating said current command signal based on said second mathematical formula.

18. (Withdrawn) A fuel cell system comprising:

a fuel cell catalytically reacting a feed stream into electrical power;

a sensor for measuring a condition of said feed stream and outputting a measurement signal;

a controller connected to receive said measurement signal and having a predictive estimation filter which, in operation, converts said measurement signal to a smooth state signal; and

a control element having been connected to said control module for receiving said smooth state signal to regulate said control element for controlling the said condition of said feed stream.

19. (Withdrawn) The fuel cell of claim 18 wherein said predictive estimation filter comprises a Kalman filter

20. (Withdrawn) The fuel cell of claim 19 wherein said feed stream, it is an oxidant feed stream for said fuel cell and said sensor comprises a flow meter for measuring a flow rate of said oxidant feed stream.

21. (Withdrawn) The fuel cell of claim 20 wherein said control element comprises a variable speed compressor, compressing said oxidant feed stream.

22. (Withdrawn) A fuel cell of claim 20 wherein said control element comprises a control valve regulating said flow rate of said oxidant feed stream for said fuel cell.

23. (Currently Amended) A method of operating a fuel cell system for catalytically reacting a feed stream in a fuel cell comprising:

modeling a control element with a first mathematical formula to create a predictive estimation filter;

operating ~~a~~ said control element to provide a feed stream to a fuel cell at a condition;

monitoring said control element and generating a measurement signal of said feed stream based on said condition;

converting said measurement signal into a smooth state signal through use of ~~a~~ said predictive estimation filter; and

regulating said control element in response to said smooth state signal.

24. (Original) The method of claim 23 wherein said predictive estimation filter comprises a Kalman filter.

25. (Currently Amended) The method of claim 24 further comprising operating a control element to provide a ~~accident~~ reactant feed ~~strain~~ stream to said fuel cell at a flow rate.

26. (Currently Amended) The method of claim 24 further comprising operating a compressor to provide said reactant feed stream to said fuel cell at a flow rate.